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Ecology of the tiger quoll dasyurus maculatus maculatus in coastal New South Wales

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ECOLOGY OF THE TIGER QUOLL *DASYURUS MACULATUS MACULATUS* IN COASTAL NEW SOUTH WALES

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CERTIFICATION

I, Deborah L. Andrew, declare that this thesis, submitted in fulfillment of the requirements for the award Master of Science (Research), in the School of Biological Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Deborah L. Andrew

Frontispiece: The Tiger Quoll *Dasyurus maculatus maculatus*

Abstract

The mammal fauna of Australia has undergone a dramatic and significant decline since the arrival and settlement of Europeans on the east coast of Australia. Eighteen native Australian mammals are considered extinct, 35 are endangered and 51 vulnerable, out of a total of 357 species. The Tiger Quoll is considered threatened in all mainland states, it is considered rare in Tasmania, and it is listed as endangered under Federal legislation. At the commencement of this study, little was known of the biology of the Tiger Quoll and virtually nothing was known of its ecology. In this study, I used captive Tiger Quolls at Featherdale Wildlife Park in Sydney, and wild populations at Limeburners Creek Nature Reserve on the mid-north coast of New South Wales and at Barren Grounds Nature Reserve and Budderoo National Park on the Illawarra escarpment south of Sydney to investigate several aspects of Tiger Quoll biology and ecology.

Studies on the breeding biology and growth of Tiger Quolls were undertaken at Featherdale Wildlife Park. Tiger Quolls have a single breeding season each year and at Featherdale Wildlife Park Tiger Quolls mated in May with births in June. Some females had a second and sometimes third oestrus cycle if the first didn't produce pouch young. Matings and births were fairly synchronous, occurring mostly over a two to four week period with a gestation length of about 21 days. Growth curves were developed for small pouch young and juveniles and age prediction curves were developed for small pouch young up to 60 days. Both males and females reached sexual maturity in 11 months and could breed in their first breeding season following their birth. Older females reared larger litters to teat release than one-year-old females. Females increased in weight prior to the mating period, developing fat deposits around the neck. Sexual dimorphism between the sexes, males being larger, became clearly apparent by 250 days of age.

In wild populations at Limeburners Creek Nature Reserve, mating occurred in June with the birth of a single litter recorded in July. Wild young were smaller than same-aged-captive young and growth of wild young is likely to be slower once they have left the pouch. Drought conditions are likely to affect the growth of young.

The spatial and social organisation of Tiger Quolls was investigated at Limeburners Creek Nature Reserve. Males and females were found to have large home range areas. Adult females had discrete home range areas, ranging in size from 509-1511 hectares, separate from other adult females, although some daughters occupied part of the mother's home range area. Adult males had much larger home ranges (2302-3401 hectares), which overlapped extensively with other males, and intersected 2-4 female home ranges. Den sharing was never observed, except between mothers and young, and sequential use of dens by different individuals only occurred several months after the former occupant had disappeared. Adult females generally moved to a new den each day except after pouch young released the teat and were deposited in a maternal den. Tiger Quolls undertook extensive movements on a daily and weekly basis, particularly males, with maximum recorded daily journeys of 5 and 8.5 kilometres for females and males respectively. Over longer periods males were recorded travelling over 20 kilometres in nine days. Activity was not exclusively nocturnal for adult females that may be active in early to mid-morning and late afternoon, especially in cooler months when nursing young.

Home ranges included a range of habitat types, heathland, sedgeland, shrubland, forest and woodland but the majority of locality records from trapping and radio-tracking were in forest and woodland. The majority of den sites were located within areas of eucalypt open forest and the majority of dens were eucalypt hollow logs or hollows in the trunks and limbs of live or dead standing trees. Dens were also located in burrows, which appeared to be preferred as maternal dens, under small buildings and in rocky headlands.

The diet of the Tiger Quoll at Limeburners Creek Nature Reserve and Barren Grounds Nature Reserve / Budderoo National Park (Illawarra) was predominantly carnivorous with a large proportion made up of vertebrate prey at both sites (85-91%). Mammals comprised the major vertebrate group with smaller contributions from birds (9-16%), reptiles (2-7%) and fish (13-24%). Insects were present in a greater proportion at Limeburners Creek Nature Reserve (26%) than the Illawarra area (13%). Plant material was present in the diet at both sites, as was garbage. There was potential for some competition between the Dingo and Tiger Quoll at Limeburners Creek Nature Reserve

as Dingoes took a large amount of bandicoot as prey, which was also a common prey item of Tiger Quolls.

Several aspects of the biology and ecology of the Tiger Quoll make it susceptible to a range of threats. Large home range size for both males and females makes the species vulnerable to clearing and fragmentation of forest and woodland habitats, to the threat of roadkill from increased traffic density and speed and to increased direct predation from eutherian carnivores such as the fox in rural landscapes and domestic pets in urban areas. Tiger Quolls are subject to direct persecution from humans due to their attraction to kill and eat caged birds such as chickens and their attraction to carrion increases the chances of death by roadkill.

The control of eutherian predators such as the fox and Dingo through 1080 poison baiting programs has the potential to affect Tiger Quoll populations through non-target kills and may have increased impact if undertaken in the restricted breeding season of Tiger Quolls and if undertaken for several consecutive years. Impacts may be greater on low-density populations. The removal of Dingoes may have a detrimental impact on Tiger Quoll populations if Dingoes are suppressing fox numbers. Further investigation of the potential impacts of poisoning programs and the relationships between eutherian and marsupial carnivores is required.

The protection of a number of large Tiger Quoll populations throughout the species geographic range and the protection and enhancement of forested corridors across the landscape may provide some buffer to potential impact of disease, habitat loss or degradation, or invasion of introduced species following climate change to help ensure the species conservation and possible recolonisation of areas of its former range.

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